



Roadmap to Develop Rockville's Climate Action Plan

Rockville climate action planning process overview, summary of initial findings completed, proposed engagement plan, and inputs for future analysis.



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I. Introduction

The *Roadmap to Develop Rockville's Climate Action Plan* (Roadmap) outlines a strategic process to develop Rockville's first Climate Action Plan (CAP) to prioritize strategies to reduce greenhouse gas (GHG) emissions and prepare the community to adapt to a changing climate. The aim is to develop a comprehensive, yet concise plan with feasible, actionable measures for approval by the Mayor and Council. Building on past achievements,¹ the plan will guide future city policies, programs, plans and investments over the next five to ten years. Ultimately, the plan seeks to advance Rockville toward being both climate-friendly and climate-ready by implementing a variety of strategies:

- *Mitigation (climate friendly)* - mitigation strategies that slow the pace and lessen the severity of climate change by reducing or offsetting greenhouse gas emissions from local government and community-wide activities; and
- *Resiliency (climate ready)* - resiliency strategies that protect infrastructure, buildings, services, ecosystems, public health, and quality of life from the impacts of climate change by reducing community vulnerability and increasing the capacity to recover from a disturbance and/or adapt to new conditions.

Rockville is uniquely positioned to leverage technical resources and collaborate with initiatives from Montgomery County, the state of Maryland, the Metropolitan Washington Council of Governments (COG), and other regional organizations. This allows Rockville to focus its limited resources on working with community stakeholders to identify the community's challenges and goals and prioritize local viable strategies and actions. Rockville's local capacity for climate action includes reinforcing broader regional initiatives as well as instituting local policies, programs and investments associated with land use and zoning, transportation networks, building codes, municipal operations capital improvement plans, housing and community services, and public engagement. Developing a successful plan will involve staff and community engagement to foster awareness, buy-in, and identify creative opportunities to equitably expand energy savings and build community resiliency.

Section II describes the proposed nine-steps process to develop Rockville's Climate Action Plan. Sections III through VI provide background information on the foundational work that has already been completed, including the history of Rockville's climate commitments, initial findings on climate change risks and hazards expected in Rockville and in the mid-Atlantic region, the greenhouse gas inventory for the community and city operations, and the status of work underway in several sectors related to climate and sustainability. Section VII describes the community engagement approach. The final three sections describe the list of potential future actions for further technical analysis and the prioritization criteria to guide the analysis towards the best, most cost-effective, equitable, and feasible strategies for Rockville. The Roadmap concludes with next steps in Section X.

¹ Additional information about Rockville's past and planned climate-related activities is described in Figure 11. Ongoing activities are expected to continue in parallel with the Climate Action Plan development process.

II. Plan Development Process

Figure 1 provides an overview of the steps in a standard climate action planning process and the city's status and proposed timeline for completing each step. Although this shows each stage of the planning process as separate steps, many of these steps are iterative or happen concurrently. Many energy and sustainability initiatives that are underway will continue in parallel. The city is conducting some steps in-house and is coordinating with COG and a consultant (Cadmus) on the remaining steps, scoping the project to fit within the limited resources available. Crafting the plan may take about a year depending on staff capacity, availability of data and analysis resources, and level of public engagement.

The city completed Steps 1 (see Section III), Step 2 (see Sections IV and V), Step 3 (see Section VI) and Step 4. Details on the community engagement approach for Steps 4, 5 and 7 are provided in Section VII. The inputs, criteria and actions for technical assessment involved in Step 6 are described in Sections VIII and IX of the Roadmap.

At this time, staff requests Mayor and Council review and feedback on the overall process going forward (Figure 1); Step 4, the community engagement strategy (p. 28); and Step 6, actions to assess for cost-benefit (p. 32).

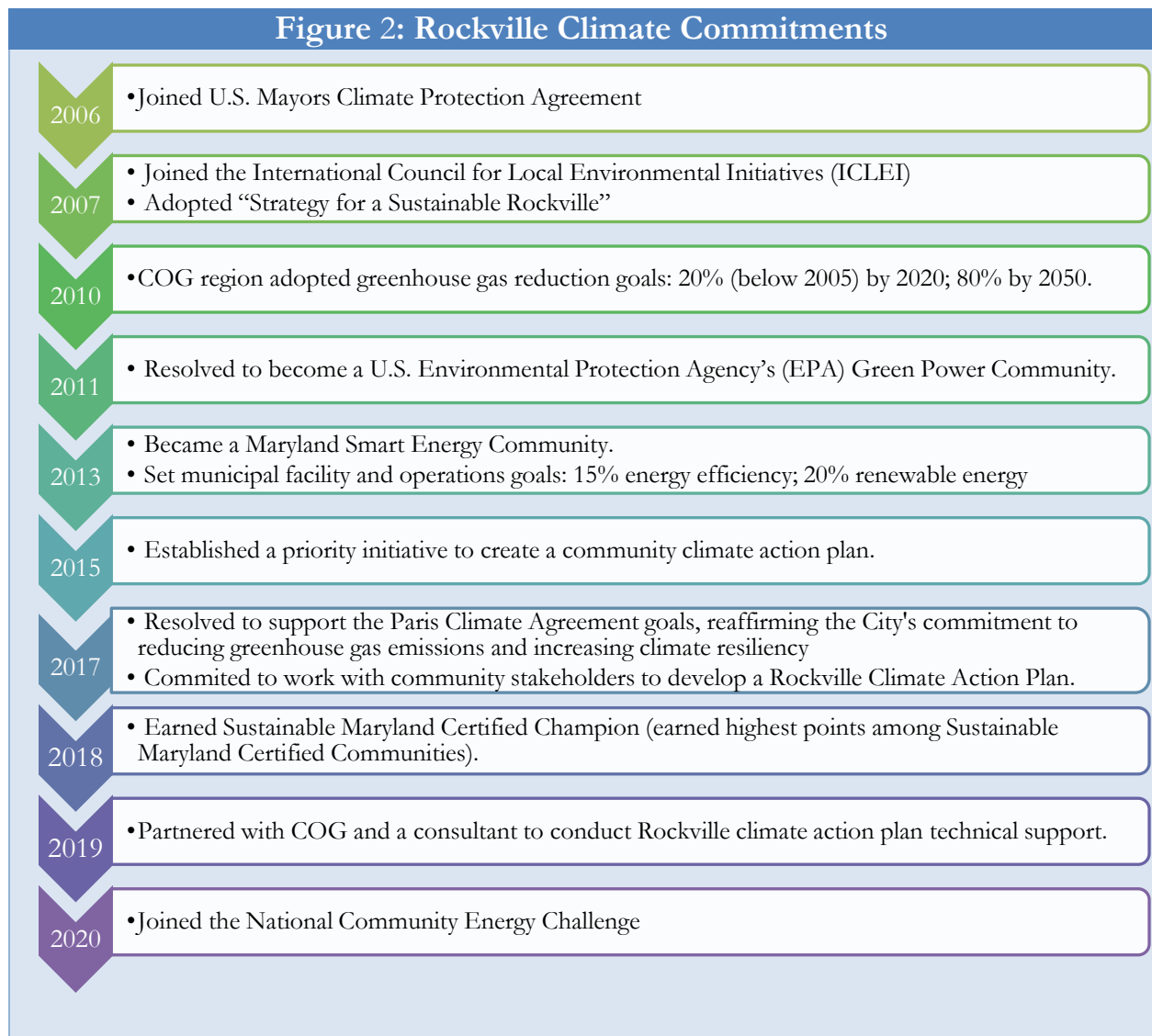
Figure 1: Climate Action Process and Status

Step	Status/Proposed Timeline
1. Mayor and Council commitment to Paris Agreement	Complete: The Mayor and Council adopted a resolution in 2017.
2. Identify climate risks and develop greenhouse gas inventory	Complete: Staff coordinated with COG to summarize climate risks and develop Rockville's greenhouse gas inventories. Draft summaries of climate risks and greenhouse gas inventories are included in the Roadmap and may be updated as additional refined local information becomes available.
3. Conduct appraisal of current climate actions and best practices	Complete: Staff coordinated with COG, the Environment Commission, and Montgomery County to review best practices, appraise Rockville's current climate actions, and identify potential future climate actions suitable for Rockville. A summary of current climate actions is included in the Roadmap.
4. Develop community engagement strategy and communication plan.	Complete: A draft community engagement strategy was developed in coordination with the Public Information Office over the summer. We will continue to refine this strategy as we receive feedback from the Mayor and Council and the community to ensure engagement goals are met.
5. Engage community on goals, actions and	Ongoing: Community engagement is underway. An online survey was opened September 2020 to February 2021. Staff

criteria. Engage staff on climate resiliency.	met with boards and commissions. Staff is conducting internal discussions with departments to conduct an internal climate vulnerability and equity screen.
6. Cost, benefit and prioritization analysis. Identify lead, partners, resources and timelines.	Winter 2020/Spring 2021: FY20 funds were encumbered to work with COG and a consultant to provide technical support. The consultant is helping the city assess the costs and benefits of potential future greenhouse gas reduction actions. The results, along with the resiliency and equity screen, will be shared with staff and community stakeholders to help prioritize actions and identify implementation measures.
7. Draft plan. Engage community to finalize and adopt plan.	Spring/Summer 2021: Draft plan and receive stakeholder feedback on draft plan and recommended implementation measures. Planned Fall 2021: Present draft plan to Mayor and Council for review and approval.
8. Implement plan	Planned Fall 2021: The beginning of plan implementation is intended to coincide with the FY 2023 budget planning process. (Ongoing Rockville sustainability and climate work programs continue in parallel.)
9. Track and report progress	Future reporting to be coordinated with COG's greenhouse gas emissions inventory cycle (currently triennial). Mayor and Council provided annual updates.

III. History of Rockville's Climate Commitments

Cities play a pivotal role in addressing climate change. Half the world's population lives in urban areas, and cities often serve as first responders to the extreme weather associated with climate change. Cities also consume more than two-thirds of the world's energy and account for more than 70% of global carbon emissions—which means they also play a critical role in cutting emissions. While the City of Rockville's share of global emissions is relatively small, community leadership is a powerful force when multiplied across cities throughout the world. Rockville's elected officials have adopted several climate commitments over the last decade and agree that the next critical step is to engage with community partners to develop a Climate Action Plan (Figure 2).



IV. Climate Hazards and Impacts

This section provides a description of the types of climate change hazards and impacts that Rockville will continue to experience. This initial high-level overview provides 1) the foundation for a closer examination of what the city can do to be better prepared locally, and 2) evidence that reducing emissions in the short-term can significantly reduce long-term risks to human health, infrastructure, buildings, services, and the environment.

With 3,100 miles of shoreline, Maryland is one of the most vulnerable states in the nation to climate change. According to the National Oceanic and Atmospheric Administration's (NOAA) historic records of temperature and precipitation, climate change has already begun to impact Maryland residents, businesses and visitors through higher, prolonged summer temperatures and increased precipitation variability. Several Maryland communities are already experiencing more frequent flooding, severe storm damage, and health effects from increased temperatures, poor air quality, and shifts in vector-borne diseases that pose economic, health and environmental challenges.

While Rockville's location and elevation protect it from direct impacts of rising sea levels, the city is vulnerable to the following changes in weather patterns: (Figure 3):

- Rising temperatures and more frequent and intense heat waves;
- Concentrated heavy rainfall; and
- Increased frequency and severity of storms.

Changes in temperature, precipitation, and storms are climate drivers that impact built infrastructure, ecosystems and ultimately pose significant health risks to our community (Figure 4). Climate change affects everyone but tends to have outsized impacts on the same communities that have suffered disproportionate health and economic impacts from the COVID-19 pandemic – low income groups and communities of color. Heat and humidity contribute to poor outdoor air quality days and extended allergy seasons, which increases human health risks, especially for sensitive populations such as children, the elderly and low-income. The city must prepare to assist vulnerable populations, especially in emergencies.

Given the city's location on high ground, the city's infrastructure is not as prone to major flooding as it is to local drainage problems. Because a warmer atmosphere holds more water vapor, Rockville's stormwater and transportation infrastructure is vulnerable to an increase in heavy precipitation events, and the city must plan accordingly.

Rockville is dependent on local and regional infrastructure such as roads, bridges, transit, water and wastewater systems, communications, and electrical and natural gas networks that are vulnerable to climate impacts including Potomac River flooding, rising tides and storm surge. Continued coordination throughout the region will be needed to prepare for these and other national or global disruptions (i.e. to agriculture, to supply chains, to water supply, leading to conflict and migration) resulting from climate change.

Figure 3: Climate Projections for Washington D.C. and Vicinity**TEMPERATURE INCREASE²**

- Average summer highs will be 6 or 7 degrees warmer by mid-century, and up to 97°F towards the end of the century (high emissions).
- The number of days with a heat index over 95°F is projected to double in coming decades and could triple by 2100.
- The current yearly number of heat waves (4) and length of average heat waves (5 days) could double by 2100.

PRECIPITATION INTENSITY³

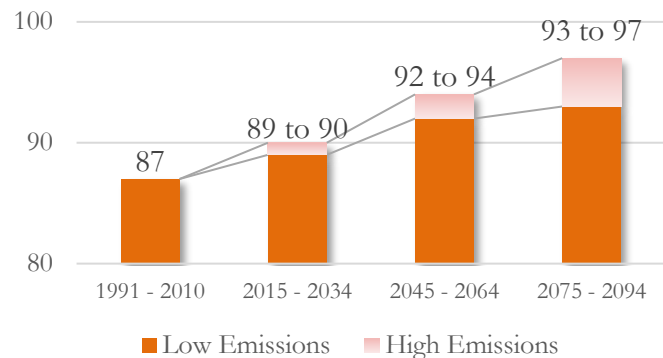
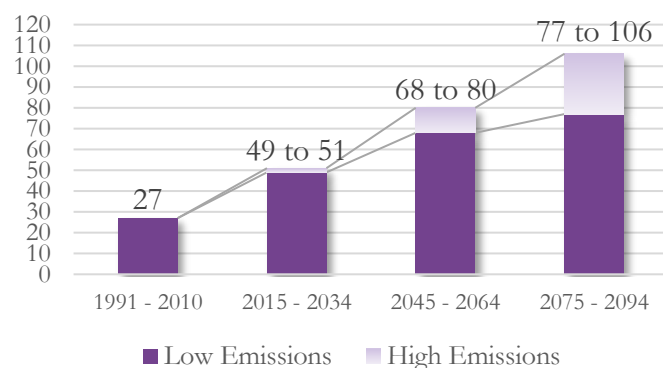
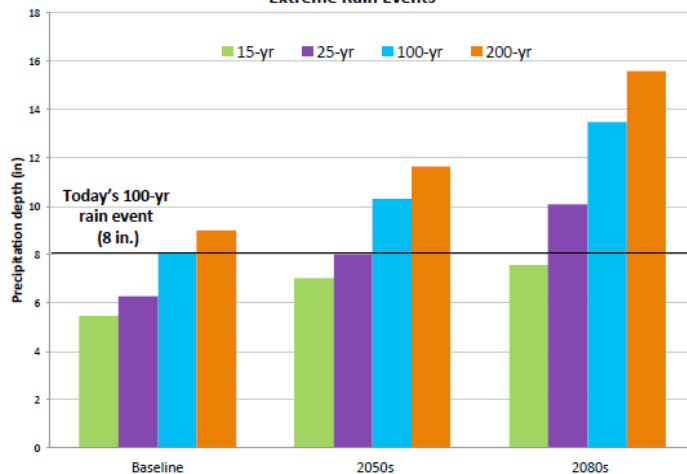
- Winters and springs are wetter.
- Precipitation is becoming more episodic with heavier rainfall concentrated into fewer events. Today's 100-year rain event may increase from 8 up to 14 inches.
- Drought and water supply are not major risks for the area but should be monitored.

SEVERE STORMS³

- The number and severity of extreme weather events is projected to increase (e.g., more concentrated rainfall events, high winds, hurricanes, nor'easters, hail, tornados, thunderstorms, ice storms, and other storm-related conditions).
- Intense snowstorms possible in near term but average snowfall is decreasing over time.

SEA LEVEL RISE⁴

- Sea level rise combined with local land subsidence is 1.2 to 4.2 feet or more by 2100, depending on emissions and ice sheet dynamics, plus storm surge flooding, i.e., the tidal Potomac rose 10ft. with Hurricane Isabel.

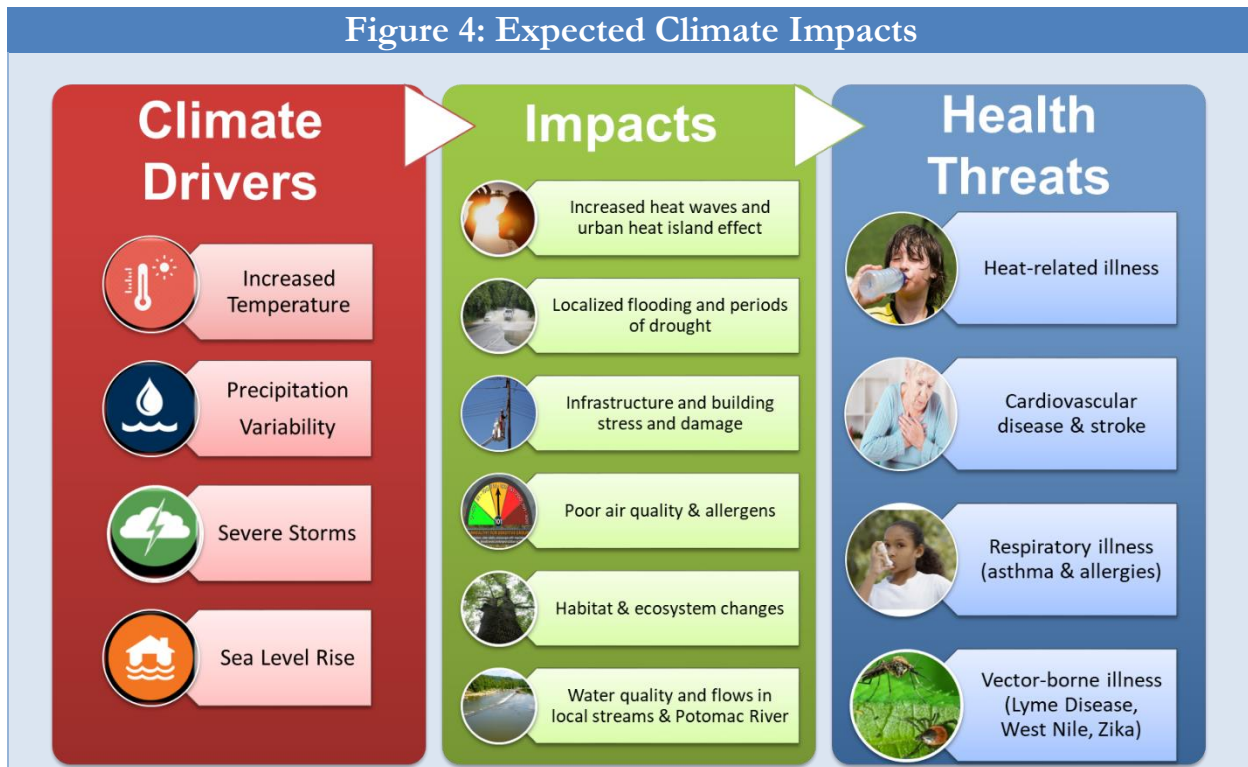
Average Summer Daytime Highs (°F)**Days Per Year with Heat Index Over 95° F****Extreme Rain Events**

² District of Columbia Climate Projections, 2015 <https://doee.dc.gov/node/1110407>

³ Fourth National Climate Assessment, 2018 <https://nca2018.globalchange.gov/>

⁴ Sea Level Rise Projections for Maryland, 2019 https://www.umces.edu/sites/default/files/Sea-Level%20Rise%20Projections%20for%20Maryland%202018_1.pdf

Figure 4: Expected Climate Impacts



IMPACTS TO INFRASTRUCTURE, BUILDINGS AND SERVICES

- Risks to transportation, stormwater, wastewater, drinking water, and energy infrastructure and increased demand for emergency management services:
- Increased urban heat island effect, demands on building cooling systems, and summertime peak energy demand and energy costs.
- Risk of brown outs or black outs from strained energy infrastructure or severe weather.
- Increased intensity of precipitation events increases the likelihood of runoff volumes exceeding stormwater capacities, causing localized flooding and drainage problems.
- Extreme heat and storms impact the lifespan, performance, and maintenance needs of buildings (roofs, envelope, mechanical systems, etc.), infrastructure, parking lots, sidewalks, streets, bridges, etc.
- Impacts to transportation that cause more frequent travel disruptions and delays (downed trees, power outages, rail).
- Increased heat waves, precipitation variability (flooding and drought) and poor outdoor air quality impacts to community recreation and parks resources and services (facilities, parks, fields, cooling centers, outdoor activities).
- Extreme weather events, sedimentation, drought, and algal blooms pose risks to Potomac River that impact drinking water supply and treatment.

IMPACTS TO ECOSYSTEMS AND THE ENVIRONMENT

- Vegetation & wildlife ecosystem shifts; current species may be vulnerable to invasive species, pests, disease, and habitat changes.
- Risks to stream health from changes and variability in seasonal stream flow (flash flooding and drought) and changes in water quality (temperature, sediments, nutrients, dissolved oxygen).
- Increased stress on urban tree canopy and landscapes, increased watering demands, more frequent maintenance and replacement.

HEALTH THREATS

Extreme heat and precipitation events, poor outdoor air quality days and extended allergy seasons increase human health risks, especially for sensitive populations such as children, the elderly and low-income:

- Heat related illness (heat stroke, rashes)
- Respiratory illness (asthma, allergies, respiratory disease)
- Cardiovascular disease, heart attack and stroke
- Vector-borne and infectious diseases (West Nile, Lyme Disease and other tick, mosquito, and foodborne illness)

Maryland Department of Health and Mental Hygiene. Maryland Climate and Health Profile Report (2016).

Metropolitan Washington Council of Governments (COG). Summary of Potential Climate Change Impacts, Vulnerabilities, and Adaptation Strategies in the Metropolitan Washington Region (2013).

Next steps on climate resilience

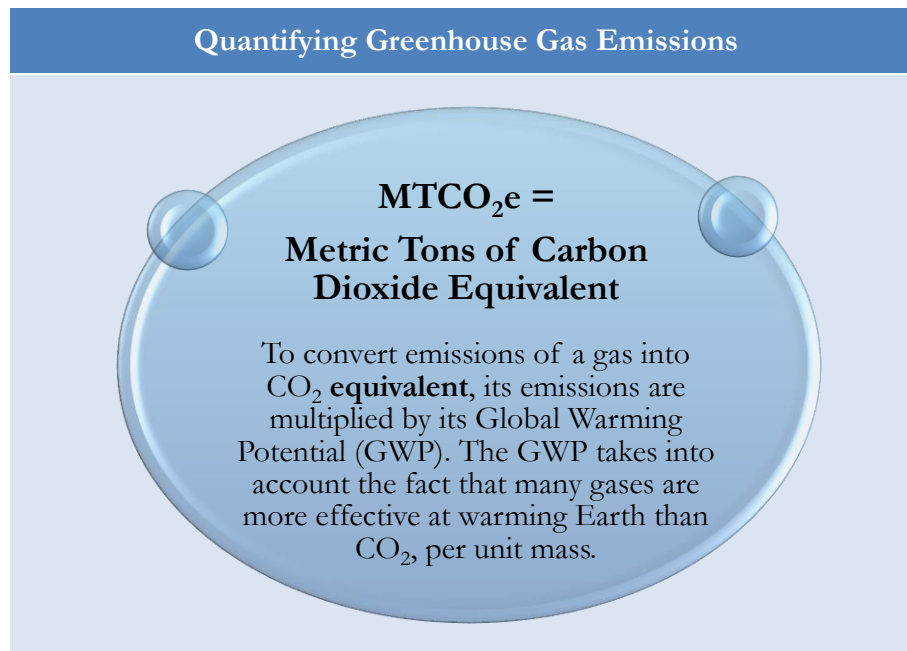
Rockville can reduce future costs of climate change by preparing for more intense heat waves, intense precipitation patterns, and severe storms. Planning for climate resiliency focuses on protecting infrastructure, buildings, ecosystems, public health, and quality of life by identifying potential climate impacts, reducing community vulnerability, and increasing the capacity to recover from a disturbance and/or adapt to new conditions.

Some preparation for recent and near-term changes in weather patterns will be necessary regardless, but after about mid-century, the high emissions scenarios and low emissions scenarios diverge. The most disastrous impacts can be avoided by drawing down emissions and working towards carbon neutrality across the globe.

The city has made relatively more progress in emissions mitigation than climate resilience. The Climate Action Plan development process will involve conducting a vulnerability screen in-house, including an update to the most recent climate science observations and projections, an inter-departmental coordination to identify ways to improve Rockville's climate resilience in the short term, medium term and long term. This work will identify climate impacts that may have higher risk, especially for under-served communities, and warrant a further analysis to identify the types of actions needed to protect the city from future risks.

V. Greenhouse Gas Emissions

A community greenhouse gas (GHG) inventory represents the total emissions produced by all activities within the city limits as well as emissions resulting from electricity use within the jurisdiction, even if the electricity is generated elsewhere. A municipal GHG inventory is a subset of the community emissions and only includes the emissions associated by city government facilities and operations. To estimate baseline emissions and track progress, global warming potential values are used to combine emissions of various greenhouse gases into a single weighted value for emissions, commonly referenced as metric tons of carbon dioxide equivalent (MTCO₂e).



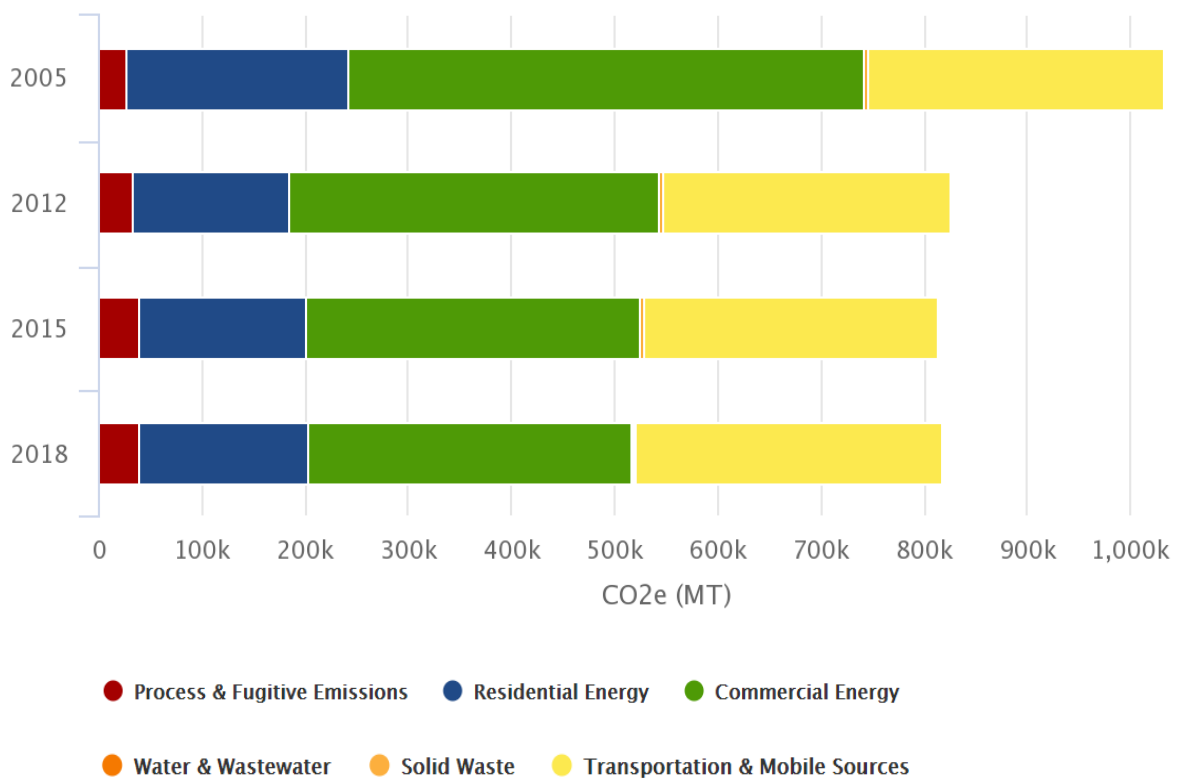
Rockville is a member of the Metropolitan Washington Council of Governments (COG), an independent, nonprofit association that brings area leaders together to address major regional issues in the District of Columbia, suburban Maryland, and Northern Virginia. COG has taken a leadership role in developing community greenhouse gas inventories for member jurisdictions, hosting regional climate impacts and resiliency planning workshops, and developing a Regional Climate and Energy Action Plan (2017-2020) that offers a variety of voluntary and flexible options for local governments to implement to support regional GHG emissions reduction goals. Rockville, working in coordination with other organizations and cities, can draw on a range of support services to address the key barriers to city climate action. Benefits include technical support, improved access to data, broader community networks, and access to business and financing opportunities to transform markets.

Emissions Trends

Rockville's community GHG emissions inventory was developed by COG to be consistent with regional and jurisdiction inventories and is based on the ICLEI U.S. Community Protocol and ClearPath tool (Figure 5). The inventory accounts for emissions from local residential and commercial building energy use, transportation energy use, emissions from solid waste incineration, and process and fugitive emissions (leaks from natural gas infrastructure and cooling systems). The estimated emissions from water and wastewater processes is relatively small.

To track progress, COG calculated jurisdiction and regional GHG estimates for 2005, 2012 and 2015, and 2018. Despite Rockville's 17% population growth between 2005 to 2018, GHG emissions reduced 21% in 13 years. Over this period, per capita emissions decreased from 17.3 to 11.7 MTCO₂e per person. Rockville surpassed COG's 2020 emissions reduction goals, demonstrating that GHG reductions are possible even as the population and economy grows. Efficiency and switching to cleaner fuel sources for electricity production contributed to these reductions. COG is currently compiling data to generate Rockville's "business as usual" projections.

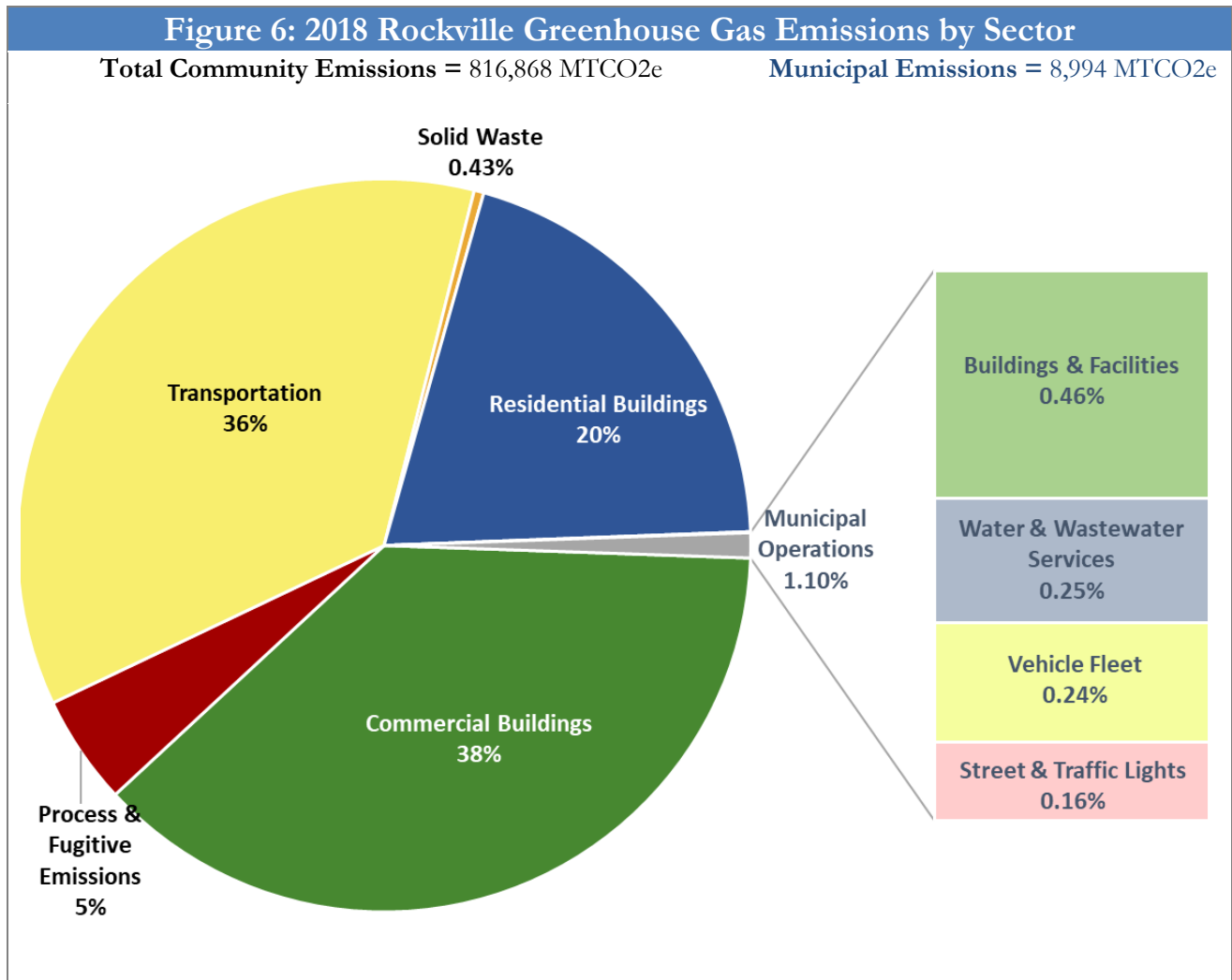
Figure 5: DRAFT GREENHOUSE GAS TRENDS CHART - CITY OF ROCKVILLE



The inventory does not account for consumption-based emissions associated with products and services consumed in the community nor for the positive effects of voluntary purchases of Renewable Energy Credits (RECs) on the part of the city, businesses and residents.

Community and Municipal Emissions Overview

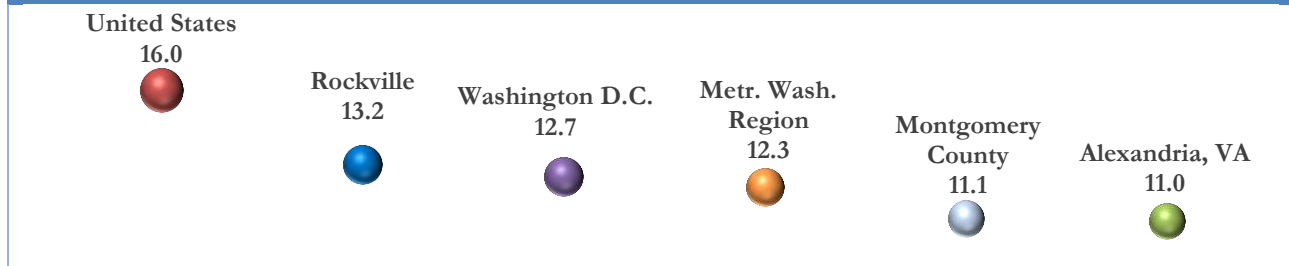
The largest emissions contributors are commercial building energy consumption (38%), transportation (36%) and residential building energy consumption (20%) (Figure 6). GHG emissions from Rockville government operations contributed approximately one percent of Rockville's total community emissions⁵.



⁵ Municipal emissions are estimated based on Fiscal Year 2016 data.

On a per capita basis, 2015 is the latest year for which data is available to compare the different jurisdictions. Rockville generated 13.2 metric tons per capita in 2015 -- below the U.S. average, but slightly higher than other neighboring jurisdictions (Figure 7).

Figure 7: 2015 Emissions Per Capita (MTCO₂e)



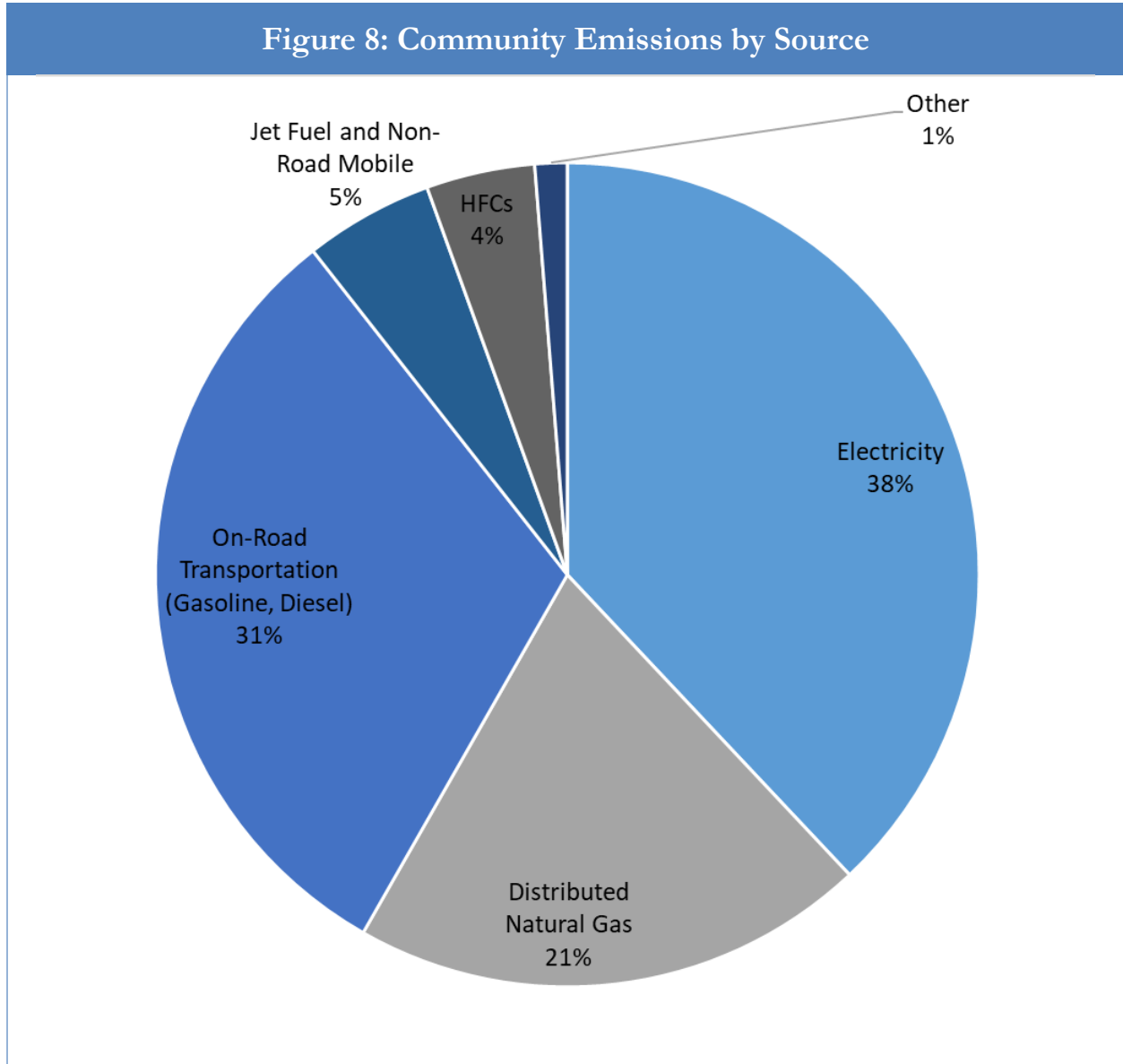
Community Emissions by Sector

Sectors contributing to Community emissions include:

- Buildings (58%):** The electricity, natural gas and fuel oil used in all buildings account for the majority of Rockville's GHG emissions. Commercial buildings generated approximately 38% of emissions, 28% from electricity and 10% from natural gas. Residential buildings account for approximately 20% of emissions, with 10% from electricity, 10% from natural gas, and < 1% from home heating fuels.
- Transportation (36%):** The transportation sector, including on-road passenger vehicles, aviation, rail and off-road vehicles, contributed approximately 36% of emissions. The majority of transportation emissions, approximately 31% of total emissions, were generated by diesel and gasoline fuel consumed by on-road mobile sources, such as passenger vehicles, buses and commercial vehicles.
- Process and Fugitive Emissions (5%):** Process and fugitive emissions are derived from national figures to account for leaking natural gas infrastructure and cooling systems.
- Other sources:** Solid waste, agriculture and wastewater make up the remaining 1% of emissions.

Community Emissions by Source

Rockville's greenhouse gas emissions come from three primary sources: electricity use (38%), natural gas use in buildings (21%), (approximately 40%), and on-road transportation fuels including gasoline, diesel (31%) (Figure 8).



Most electricity-related greenhouse gases are emitted by coal and natural gas-fired plants, which together generate over half of the electricity on the grid subregion that serves Rockville. The other major source of electricity is nuclear.⁶

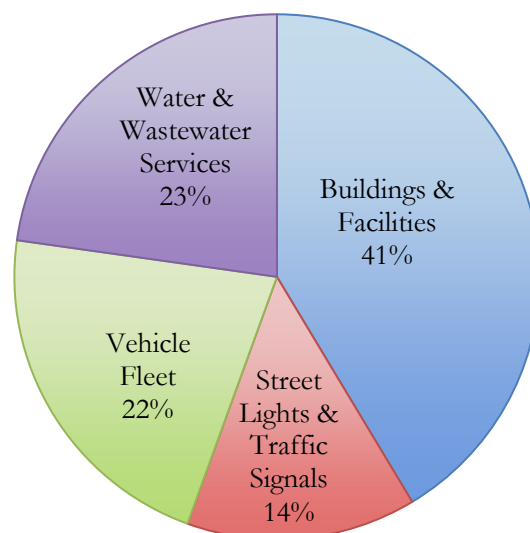
⁶ For more information on the electricity fuel mix that was used in the greenhouse gas inventory, see: <https://www.epa.gov/energy/power-profiler#/RFCE>

Municipal Emissions by Sector

Rockville used ICLEI's ClearPath tool to estimate GHG emissions generated from municipal facilities and operations for fiscal year 2016 (July 1, 2015 through June 30, 2016) (Figure 9). The government analysis data was sorted into buildings/facilities, street and traffic lights, water and wastewater services and vehicle fleet. Data on employee commutes, process and fugitive emissions, and waste from city facilities was not available. While GHG emissions from local government operations represent approximately one percent of Rockville's total community emissions, the city has direct influence over these sources and the ability to 'lead by example'. Sectors contributing to municipal emissions include:

- **Buildings and facilities (41%):** city buildings, facilities and parks are the largest source of municipal GHG emissions through the use of electricity, natural gas and fuel oil for heating, cooling, lighting, and other purposes. city facilities include City Hall, Swim and Fitness Center, Senior Center, Police Station, Civic Center Complex, Public Works and Parks Maintenance Complex, and several community centers.
- **Water and wastewater services (23%):** The city provides drinking water and sewer services to 70 percent of the city. Approximately 23% of emissions are associated with electricity-intensive water treatment and pumping operations.
- **Fleet (22%):** Fuel (diesel and gasoline) consumed by a fleet of approximately 278 on-road vehicles and equipment accounted for approximately 22% of emissions. Police vehicles and refuse and recycling trucks account for most municipal fuel consumption.
- **Street and traffic signals (14%):** The electricity used to power approximately 6,573 municipal streetlights and 46 traffic signals accounts for 14% of emissions.





Figure 9: City of Rockville Municipal Emissions



VI. Summary of Rockville's Climate Actions

Climate actions pose both challenges and opportunities across a range of sector categories, summarized in Figure 10. Table 2 also touches on challenges and opportunities in each sector.

Rockville and partners have already been working on many initiatives with climate and sustainability-related benefits. Figure 11 summarizes these existing programs, policies, plans, and accomplishments across the sector categories. Developing the Climate Action Plan will involve identifying gaps to build on this work. Figure 11 also provides an outlook on Rockville and Montgomery County potential and planned actions over the next year.

Figure 10: Climate Action Plan Categories ⁷		
	Energy Efficiency	<p>Challenge: Building energy consumption accounts for 58% of Rockville greenhouse gas emissions.</p> <p>Opportunities: Optimize building energy performance with upgrades to insulation, HVAC systems, lighting, appliances, occupancy sensors; seal air leaks; use natural lighting; optimize maintenance and operations; consider combined heat/power, microgrids, district energy.</p>
	Renewable Energy	<p>Challenge: Coal, gas, and oil account for 55% of Maryland's electricity, nuclear 37% and renewables only 12%.</p> <p>Opportunities: After optimizing energy efficiency, increase local and utility-generated renewable energy: solar, wind, biomass, geothermal; and increase green power purchases.</p>
	Sustainable Transportation	<p>Challenge: Transportation – cars, trucks, trains, buses, and airplanes -- accounts for 36% of Rockville emissions.</p> <p>Opportunities: Align transportation, land use, and urban design policies to support choices - walking, bicycling, transit, ridesharing. Increase fuel efficiency electric vehicle ownership and charging stations. Increase affordable housing near jobs.</p>
	Sustainable Development & Green Space Conservation	<p>Challenge: Development patterns affect greenhouse gas emissions rates, tree canopy, open space, water and air quality, urban heat island, natural habitat, and quality of life.</p> <p>Opportunities: Direct most population and employment growth to compact, mixed-use, walkable, bikeable, transit-oriented places and conserve natural habitat, trees, and green infrastructure.</p>

⁷ The climate action plan categories are derived from best practices and aligned with state and regional strategies, including COG's *Regional Climate and Energy Action Plan*, and customized for Rockville.



Waste

Challenge: The production, consumption and disposal of goods and food contribute to the generation of greenhouse gas emissions (note: product cycle not included in greenhouse gas inventory except for landfill gas).

Opportunities: Reduce waste and encourage sharing, re-use, recycling, composting, and the circular economy.



Climate Resilience

Challenge: Heat waves, heavy downpours, and severe storms pose risks to health, businesses, infrastructure, the environment, supply chain, and services.

Opportunities: Optimize drainage, absorption, and cooling through reducing impervious surfaces, green or white roofs, shade, and green infrastructure. Improve emergency response, keep infrastructure in state of good repair, update continuity of operations plans. Consider climate resiliency when replacing/rehabilitating infrastructure.



Equity, Health, & Clean Economy

Challenge: Some populations (youth, elderly, communities of color, disabled, low-income, first generation and foreign language speakers) may have less access to affordable green options, may experience increased exposure to climate risks, and a lowered capacity to bounce back in the event of natural hazards.

Opportunities: Ensure eco-friendly housing, energy, green space and transportation choices are equitably available to residents and businesses. Build adaptive capacity by addressing chronic stressors. Increase opportunities for climate action planning to incorporate social equity, cultural sensitivity and community health considerations into program and policy decisions. Increase investment in the regional clean economy.


Figure 11: Rockville Climate & Sustainability Accomplishments and Near-Term Outlook

Legend

CATEGORY	
1. Actions	
 = Actions that affect <u>municipal</u> operations and city facilities	 = Actions that affect Rockville homes, businesses, and the <u>community</u>
<i>Outlook: Near-term planned or expected actions by city, County, or COG.</i>	


ENERGY EFFICIENCY


1. Analyze greenhouse gas emissions


 Municipal inventory completed for years 2005, 2012, 2016


 Community inventory completed for years 2005, 2012, 2015, 2018


2. Develop city and community climate change, energy or sustainability plan


 The city adopted a 15% energy efficiency goal, 20% renewable energy goal, and municipal energy plan in 2013 as part of the Maryland Smart Energy Communities program.

 Staff participate in national, regional and County climate and sustainability policy committees and workgroups.

 The *Strategy for a Sustainable Rockville* (2007) includes several actions for reducing government emissions and promoting community sustainability.


 The Sustainability Survey (2012) identified community priorities.


 Rockville earned Sustainable Maryland Certification in 2012, 2015 and 2018.


 Climate actions are proposed in the draft 2040 Master Plan.

Outlook: Participating in National Community Energy Challenge benchmarking program in 2020. Develop Rockville Climate Action Plan 2020-2021. Re-certify Sustainable Maryland in 2021.

3. Track, benchmark and publicly disclose large building energy performance

 The city uses ENERGY CAP and ENERGY STAR Portfolio Manager to track monthly energy data for all utility accounts.

 The city reports annual City Hall energy performance data to comply with Montgomery County energy benchmarking law.

 In 2016, the Mayor and Council amended the City Code to allow Montgomery County's building energy benchmarking requirements to apply within the city. Approximately 150 non-residential properties greater than 50,000 square feet benchmark and report building energy performance.

Outlook: Montgomery County is updating their building energy benchmarking law to include a smaller size threshold and multifamily buildings.

4. Increase existing building energy efficiency. Conduct municipal building energy audits and install retrofits. Promote energy efficiency incentives for residences and businesses.

As an ENERGY STAR partner and a Maryland Smart Energy Community (MSEC), the city has implemented the following energy efficiency projects with a combination of MSEC grants, city funds, and Pepco rebates:

- 🏠 Three chillers, one air handler, LED lighting, and several appliance retrofits were completed at the F. Scott Fitzgerald Social Hall, Glenview Mansion, and Lincoln Park Community Center.
- 🏠 Fifteen programmable thermostats at 8 facilities.
- 🏠 Swim and Fitness Center/Welsh Park: North pool air handler/heat recovery; LED pool lighting and parking lot lighting; energy efficient lighting and plumbing fixtures in the locker room renovation.
- 🏠 Water Treatment Plant: Conducted energy audit to identify electrical system upgrades for consideration in an upcoming plant rehabilitation project.
- 🏠 The Facilities Division initiated a preventative HVAC maintenance program to improve efficiency.
- 🏠 The Police Station and Thomas Farm Community Center incorporated green building features in design and construction.
- 🏠 The city and Johnson Controls (JCI) entered into a Performance Contracting Partnership. In 2004, building performance energy audits of the Civic Center, Senior Center, Swim Center, Croydon Creek Nature Center, City Hall, Lincoln Park Community Center, Horners Lane Pump House, Water Treatment Plant, Theater & Social Hall, Redgate Clubhouse, Montrose, Rockcrest, and Gude were conducted. JCI completed construction on energy upgrades in 2005.



The city coordinates with Montgomery County to hold free LED light bulb exchange outreach events for residents.



The city promotes energy efficiency funding and incentive programs offered by Pepco, Washington Gas, the Maryland Energy Administration, Montgomery County Green Bank, and Montgomery County Property Assessed Clean Energy (C-PACE program)





Rockville Community Services is coordinating with a non-profit (Blockchain Frontiers Foundation) and the Maryland Energy Administration to provide energy audits and efficient home improvements for low-to-moderate income Rockville residents. 22 homes have been assisted to date. The program received additional funding in 2020.

Outlook

- The city plans to conduct an energy audit of City Hall to identify energy saving measures (funded FY21).
- The city was awarded a Maryland Smart Energy Communities grant to upgrade interior lighting at Lincoln Park Community Center. The project was completed in July.
- Montgomery County is considering Building Energy Performance Standards that will apply to existing commercial and multifamily buildings over a specified size and require improved energy performance.

5. Implement green building codes for new buildings

 Chapter 5 of the City Code includes green building and energy efficiency code requirements that apply to city buildings and renovations.

 City staff are voting members of the International Code Council's building code development process. They participate in energy conservation and green building code development.



Rockville Green Building Regulations, which apply to residential and commercial new construction and major renovations, incorporate the 2015 International Green Construction Code and the 2018 International Energy Conservation Code.

Outlook: Montgomery County is considering updating their green building tax credit program to incentivize buildings that exceed code requirements; Rockville buildings are eligible for County tax credits.


6. Install combined heat and power, district energy, and microgrid systems



The city supported Pepco's proposal to pilot a microgrid in Rockville Town Center which would serve both private and municipal buildings. The Maryland Public Service Commission denied the initial proposal. Pepco has not indicated if they will resubmit a revised proposal.

Outlook: Montgomery County received an energy planning grant to consider multiple options including a microgrid or combined heat and power system to serve County facilities in the Rockville core.

7. Implement city sustainability and residential and commercial green engagement programs (i.e. green business or home challenges, awards, etc.).

 The city has a process to re-use unneeded office furniture, recycle un-used electronics, and is exploring paper-saving initiatives.



The city recognizes environmental achievements in the community through the annual Environmental Excellence Awards.



The city promotes Montgomery County's initiatives including Green Business Certification program and the Maryland Green Registry.




EMD staff work closely with PIO to conduct ongoing environmental outreach and communications through social media, Rockville Reports, Channel 11, and the Environment & Sustainability e-newsletter.

Outlook: Environmental Management is considering piloting a green business program for food-service establishments and automotive repair shops to recognize green practices.

The CAP will identify opportunities for interdepartmental sustainability/climate initiatives.

8. Upgrade to energy efficient outdoor lighting


 The city completed outdoor LED retrofits at Maryvale Park, Welsh Park/Swim & Fitness Center, City Hall, Lincoln Park Community Center and F. Scott Fitzgerald Theatre.


 The city replaced traffic lights and 185 streetlights with more efficient LED fixtures.

Outlook: The Maryland Energy Administration supported a preliminary analysis of retrofitting Rockville-owned and Pepco owned streetlights to LED. Additional coordination with Pepco is on-going for comprehensive LED streetlight retrofits (pending PSC approval).

RENEWABLE ENERGY

1. Promote incentives and financing mechanisms for on-site renewable energy and energy storage. Install renewable energy systems at city facilities.

 A geothermal heating and cooling system is installed at the Thomas Farm Community Center.

 In 2015, the city worked with EPA and a solar company to assess the feasibility of installing solar at city facilities. Unfortunately, there were several site-specific barriers that made installation economically unviable.



Rockville has promoted the residential solar co-op opportunities, working with the County and a non-profit, in 2015, 2016, 2017, 2019, and 2020. The 2020 solar co-op included an electric vehicle charger option.




Permits for solar installations total more than 500 in Rockville.

Outlook:

Staff is exploring the feasibility of installing solar at 6 Taft Court.

9. Increase green power purchasing, cooperative and aggregate purchasing. Join EPA Green Power Partnership for government and Green Power Community Partnership community-wide.

 Rockville is an EPA Green Power Partner since 2011. The city continues to purchase wind renewable energy certificates (RECs) for 100% of municipal electricity consumption.





In FY 2011, the Mayor and Council adopted a resolution to become a U.S. Environmental Protection Agency's (EPA) Green Power Community.



In 2020, the Rockville community purchased nearly 75,000,000 kWh of green power covering 8% of demand.

10. Support utility, state, and national-level renewable energy expansion policies including renewable portfolio standards

 Rockville supports reasonable, cost effective State and Federal legislation on energy and sustainability. Rockville supported increasing Maryland's Renewable Portfolio Standard (RPS) in 2016 through 2019.




 In 2020, Rockville supported the Community Choice Energy Act.







The Rockville Environment Commission provides recommendations to the Mayor and Council on legislative advocacy positions.

SUSTAINABLE TRANSPORTATION


11. Adopt policies, incentives and programs to facilitate alternative fuel vehicle adoption and charger installation.


-  Pepco installed 1 DC Fast Charger and 2 Level 2 charger stations at Thomas Farm Community Center.
-  City Hall features an electric charging station with two chargers to serve the fleet.
-  The city fleet includes a Nissan Leaf, a hybrid, and recently switched from a 15-year vehicle replacement cycle to a 5-year lease cycle to provide additional fuel efficiency and safety measures.

-  Building codes include measures to encourage zero emission vehicles.
-  Maryland provides incentives for EV charging stations and electric vehicles. Draft strategies are proposed in the 2040 Comprehensive Master Plan.
-  A dozen public charging stations are in Rockville.
-  Two private compressed natural gas fueling stations are located near Rockville.


Outlook: The city and Pepco are evaluating other options to expand the EV charging network.





12. Encourage city employees and residents to take alternative commute options and to help employers offer alternative commute options to workers.

-  The city has telework, flex time and alternative work schedule options and encourages carpooling, biking, and walking.

-  Regional programs available in Rockville include COG's Commuter Connections services and Montgomery County Department of Transportation's Commuter Services.


13. Adopt a bicycle and pedestrian plan that works towards convenience, accessibility, and an interconnected system.


-  Bike lockers and changing areas are available at City Hall and various community facilities.


-  The City of Rockville is committed to encouraging bicycling for all residents of Rockville through education, infrastructure, and outreach.
-  The League of American Bicyclists recognized Rockville as a Bronze-level Bicycle Friendly Community by in 2016.
-  There are 34.3 miles of shared-use paths, 33.5 miles of shared use roads within Rockville.
-  The 2017 Bikeway Master Plan proposes an additional 21.9 mi. dedicated bikeways and 19.1 mi. shared roadways.

Outlook: The Vision Zero initiative aims to further increase bicycle and pedestrian safety.

14. Improve transit services and increase capacity (e.g. commuter bus service, real-time information, bus rapid transit) to accommodate growth around rail stations and other activity centers. Ensure access for youth, elderly, disabled, ESL, low-income populations.

 The city supports transit enhancements at the county and state level.


 The city supports Montgomery County and MTA Bus Rapid Transit initiatives and accommodates proposed routes in its Master Plans.

 The city allocates capital improvement funds toward needed transit, bicycle, and pedestrian infrastructure.



The City of Rockville does not operate its own transit system. Various transit agencies operate routes within the city, including WMATA, Montgomery County RideOn, MARC, Amtrak, King Farm Shuttle, Rockville Senior Services, etc.

15. Implement green fleet strategy.

 The city fleet is piloting one electric and one hybrid vehicle.

Outlook: The city is evaluating green fleet options under a new lease framework that reduces vehicle replacement cycles from 15 years to 5 years.


16. Enforce anti-idling policies for public fleets and off-road equipment.





Maryland has an anti-idling law that prohibits vehicle idling for more than five minutes, with some exceptions. The State law applies within Rockville. The fine for violation of this provision is up to \$500.

SUSTAINABLE DEVELOPMENT & GREEN SPACE CONSERVATION


17. Incentivize green roofs and other green infrastructure. Install green roof(s) on government property.


 Rockville Police Headquarters features a green roof.

 Rockville's Rainscapes Rewards program provides education and financial incentives to homes, neighborhoods and organizations for tree planting, conservation landscaping, rain barrels and pavement removal.


 Rockville developed a drainage manual to assist property owners in developing sound site stormwater practices.


18. Update comprehensive and small area land use plans, zoning, and urban design guidelines to allow for greater concentration of growth in activity centers that are walkable, mixed use, mixed income, and transit-oriented.


 The Land Use Element of the Comprehensive Master Plan promotes walkable, higher density, mixed use, mixed income and/or transit-oriented development in activity centers, such as Rockville Town Center and the Twinbrook Metro Station.

 The city commissioned a report from Urban Land Institute, completed in 2019, that recommends strategies for revitalizing Town Center.

19. Implement plan(s) to preserve and enhance ecologically valuable green spaces. Restore and manage natural ecosystem functions to increase capacity to adapt to a changing climate.


 Rockville's extensive parks and open space include over 905 acres of parkland in 65 parks.


 The Parks, Recreation and Open Space (PROS) Plan includes a variety of goals for increasing greenspace access and better serving Rockville's diverse community.


 The 2002 Comprehensive Master Plan includes a policy to pursue sustainable practices to protect environmental quality and natural resources for the use of present and future generations.


Outlook: The 2040 Comprehensive Plan includes a recommendation for an Open Space Management Plan.


20. Obtain and maintain Tree City USA designation. Maximize tree canopy on public property. Engage the community on tree planting.


 The city seeks to maintain tree canopy, managing over 28,000 street trees and more than 323 acres of parkland designated as Forest Preserve.

 The city has been named a Tree City USA by the Arbor Day Foundation for 30 consecutive years (1990-present).

 Tree canopy covers 50% of Rockville land area as of 2014, when the most recent analysis was conducted.


 In 2019, the city distributed 300 trees to residents to encourage tree planting.


 Rockville's Rainscapes Rewards program provides education and financial incentives to homes, neighborhoods and organizations for tree planting


 The city's Environment & Sustainability e-newsletter includes tree planting and maintenance tips.

Outlook: The city's Earth Month activities include a tree give-away event planned for the fall, 2020).

21. Require and incentivize tree protection for new development and retrofits as part of the development review process. Expand the responsibility of developers to plant or maintain trees over time.


 The Sediment Control and Stormwater Management Regulations requires environmental site design to the maximum extent practicable.

 Rockville's Forest and Tree Protection Ordinance, Street Tree Master Plan, and Landscape, Screening and Development Manual promote planting and care of trees.

 As part of the development review process, the Forest and Tree Protection Ordinance requires forest and tree protection, planting and maintenance requirements.


WASTE


22. Adopt environmentally preferred purchasing policy


 Chapter 17 of the City Code, Purchasing, was amended in 2011 to include provisions for environmentally preferable purchasing and life-cycle cost and bid award based on best value.

Outlook: The next step would be to develop environmental purchasing procedures and guidelines.


23. Adopt and enforce recycling requirements for businesses. Adopt a construction and demolition recycling policy or guidelines.

 Rockville's facilities and offices offer recycling services to employees and visitors.

 Multi-family properties, businesses and organizations are required to recycle. The program is administered by Montgomery County.


 Rockville's Green Building Regulations require construction and demolition waste management plans with the goals to reduce and recycle construction waste.

24. Implement residential and commercial organics collections, including food composting and recovery initiatives.


 The city's Recycling and Refuse program collects yard waste for composting at Dickerson.

Outlook: The city is examining options for curbside or drop-off food waste composting collections.

25. Support community activities that promote repair, reuse, reduce, and sharing opportunities.


 Community events, such as the Lincoln Park community yard sale, promote sharing opportunities.

26. Implement bans or fees on single use products which are not readily recyclable.

 A plastic bag fee, polystyrene ban, and straw ban apply in Rockville.

CLIMATE RESILIENCE

27. Assess community vulnerabilities (social, environmental, economic, public health) to climate impacts. Adopt climate adaptation/resiliency plan, policies or initiatives.


 Initial policies are included in the Draft 2040 Comprehensive Master Plan.



Climate adaptation strategies are anticipated to be included in the upcoming Climate Action Plan.


Outlook: Participate in water treatment plant resilience plan 2020-2021. Complete a climate vulnerability screen with cross-sector input as part of the CAP.

28. Assess climate vulnerability of critical infrastructure (transportation, communication, energy utility, drinking water, wastewater and stormwater facilities). Implement needed protection measures.

 The city has conducted several assessments to ensure continued performance of essential functions under a broad range of circumstances for the Water Treatment Plant and delivery system, a Debris Management Plan, an Emergency Operations Plan, and a Continuity of Operations Plan.

Outlook: The next step would be to assess any changes needed considering the recent weather patterns and projections.


29. Update zoning, building codes, ordinances, and the development review process to ensure new development is more resilient to local climate impacts.


 The adopted 2015 International Green Construction Code contains some provisions that enable buildings to be more resilient.

Outlook: Climate adaptation strategies will be included in the upcoming Climate Action Plan.


EQUITY, HEALTH, AND THE CLEAN ECONOMY

30. Direct energy, green building, and sustainability services towards underserved populations.

 Rockville leadership prioritizes diversity and engagement through such events as the Diversity Town Hall, held in 2017. Rockville Community Services provides and partners with a variety of organizations to aid and support to all members of the community through affordable housing, lower fees on parks and recreation, utility bill assistance, and environmental services.

 Rockville Community Services is coordinating with a non-profit and the Maryland Energy Administration to provide energy audits and efficient home improvements for low-to-moderate income Rockville residents. 22 homes have been assisted to date.

31. Update economic development workforce plans/strategies to incorporate strategies to support emerging green or clean tech industries.

 Rockville Economic Development, Inc. (REDI) was formed in 1997 as a 501(c)(3) by the City of Rockville to proactively support existing industry and attract new businesses to the city.

VII. Community Engagement Approach

Municipal operations account for less than one percent of Rockville's total community emissions. The remainder comes from sources such as private commercial and residential buildings and transportation where success depends on community buy-in and participation. Therefore, plan development requires coordination among community stakeholders to identify needs and goals and prioritize actions that are desirable and practical for those individuals and entities involved in implementation. Community engagement should build on the 2040 Master Plan environment element stakeholder engagement process and capitalize on existing Boards and Commissions.

Mayor and Council feedback on Figure 12 (following page), the community engagement approach, is requested. Outreach can occur virtually if necessary due to COVID-19 restrictions. Any additional elements added to the approach below will require additional resources or time.

Figure 12: Community Engagement

Element	Tentative Timeline	Details	Purpose
Boards and Commissions Engagement	<ul style="list-style-type: none"> June to February 2021 Summer/fall 2021 draft plan for feedback 	<p>Presentation and consultation with Environment Commission (lead) and additional Boards and Commissions as directed.</p> <p>Proposed: Recreation and Parks Advisory Board, Planning Commission, Human Services Advisory Commission, Traffic and Transportation, Chamber of Commerce, REDI, Bicycle and Pedestrian Advisory Committees, Lincoln Park Civic Association</p>	<ul style="list-style-type: none"> Consult existing boards and commissions on the topics related to their expertise. Provide opportunities for broad involvement and informative discussions with current volunteers.
Online Public Surveys	September through February 2021	Develop online survey. Promote electronically, in Rockville Report, social media and neighborhood listservs.	<ul style="list-style-type: none"> Collect input on climate actions from a wide variety of community stakeholders. One-way tool collects input on focused questions quickly at participant's convenience. Spanish and Chinese translations
Public Engagement Meetings <i>(similar to CMP Listening Sessions and Bikeway Master Plan)</i>	<p>Virtual Open House</p> <ul style="list-style-type: none"> November 2020 July 2021 <p>Office Hours</p> <ul style="list-style-type: none"> November 2020 April 2021 	<p>Present background and initial policy areas for input.</p> <p>Opportunity for stakeholder questions, considerations, and ideas.</p>	<ul style="list-style-type: none"> Meetings provide opportunities for education, Q&A, and background to assist in completing survey and submitting comments. Planned to be held virtually.
Staff Engagement	Ongoing	Meetings with various departments on sustainability and resilience	<ul style="list-style-type: none"> Required for effective plan development and implementation. Promotes consistency in program implementation.
Mayor and Council	<ul style="list-style-type: none"> September 2020 October 2021 	<ul style="list-style-type: none"> Work session for early guidance Draft plan presentation 	<ul style="list-style-type: none"> Provide guidance on plan process and expectations Provide high level direction-setting

VIII. Prioritization Criteria

Rockville's Climate Action Plan will likely incorporate a focused slate of strategies that draw from best practices and is right-sized for Rockville. A transparent and systematic process will be needed to prioritize community needs and identify actionable solutions for investment. Regional plans have identified many possibilities. For example, COG reviewed best practices across the country and compiled a list of 125 voluntary local government climate actions in their 2017-2020 Regional Climate and Energy Action Plan (www.mwcog.org/documents/2017/03/23/regional-climate-and-energy-action-plan-climate--energy-climate-change-energy/). Montgomery County recently lead a community engagement effort that generated more than 850 potential climate actions for consideration (www.montgomerycountymd.gov/green/climate/climate-action-planning.html).

Some actions will be more obvious in their status as 'low-hanging fruit' – actions that will quickly pay for themselves in energy savings and community co-benefits, are straight-forward to implement, and have broad support, and may have existing funding sources, such as tree planting, energy-efficient lighting, and installing solar on rooftops. For more complex or new policies, some communities systematically prioritize actions based on qualitative and quantitative criteria. Examples of these prioritization criteria are summarized in Figure 13.

Figure 13: Example Criteria to Prioritize Climate Actions	
Option/Criteria	Description
1) Effectiveness	<ul style="list-style-type: none"> - Potential to reduce greenhouse gas emissions and conserve energy, increase energy efficiency, and increase renewable energy. - Potential to improve resiliency.
2) Cost	<ul style="list-style-type: none"> - Availability of existing funding, grants, financing, incentives or partnerships. - Initial cost and savings over time to city or to other stakeholders. - Payback period for return on investment. - Potential to reduce future costs.
3) Feasibility	<ul style="list-style-type: none"> - Degree of city control to implement action. - Staff time and resources required. - Degree of stakeholder support. - Amount of time needed to implement and achieve results.
4) Health & Equity	<ul style="list-style-type: none"> - Potential to reduce pollution, exposure to harmful climate extremes, and disease vectors. - How does the action affect disadvantaged members of the community (children, seniors, second language, disabled, low-income, people of color) in the form of job creation, costs, savings, resiliency, and other opportunities? - Potential to advance equity and reduce disparities.
5) Co-benefits	<ul style="list-style-type: none"> - Potential to support other city goals and objectives (e.g., reducing waste, improving quality of life, economic development, public safety, Vision Zero transportation initiative, comprehensive plan, environmental restoration, reduced crime, and improved facilities, infrastructure, education, operations and service delivery, etc.). - Potential to reduce O&M needs and improve worker health and safety.

IX. Action Assessment

The city will work with the consultant to assess the costs and benefits of various greenhouse gas reduction strategies to assist the Mayor and Council, senior leadership, and the community to evaluate and prioritize actions for future policies, programs and projects. For a subset of up to twenty mitigation actions, a consultant will quantify potential emissions reductions to 2050, estimate associated costs/savings and assess the prioritization criteria previously described in Figure 13. The analysis will quantify state and regional contributions to Rockville's reduction goals. **Figure 14 summarizes examples of key climate actions proposed for the consultant's quantitative and qualitative analysis, subject to Mayor and Council guidance.**

Figure 14: Action Options for Cost/Benefit Assessment	
Community Actions	
1.	Aggregate green power purchase
2.	Solar photovoltaic program
3.	Commercial building energy retrofits
4.	Residential building energy retrofits
5.	Community electric vehicle adoption (vehicles and charging station network)
6.	Increased solid waste diversion (food waste, recycling, etc.)
7.	Increased forest protection and tree planting
8.	Bicycle and pedestrian infrastructure and safety
9.	Mixed-use and transit-oriented development
10.	Increase energy efficiency requirements for new buildings
City Action for Municipal Operations	
11.	Upgrade streetlights to energy efficient light emitting diodes (LED)
12.	Greening the city fleet
13.	Increase energy efficiency of city facilities and utilities
14.	Increase onsite renewable energy generation

X. Next Steps

Rockville has completed much of the foundational work needed to develop a Climate Action Plan, including a greenhouse gas inventory, initial climate impacts assessment, and inventory of current actions. Deeper analysis of several promising strategies, along with stakeholder engagement and city leadership guidance, will identify common sense approaches and cutting-edge policies that Rockville's local government is uniquely positioned to implement – such as actions that can reduce community energy use and waste, create local employment opportunities, improve air quality, protect local landscapes, reduce risks to people and property, and benefit Rockville for years to come. The draft Rockville Climate Action Plan will guide the city's priorities and facilitate implementation by assisting in identifying the partners, financing and resource options, and timeline.

Rockville's Environment Commission provided initial positive feedback at their June 4 meeting. Next, based on Mayor and Council feedback and questions, staff will continue stakeholder engagement, continue the climate resiliency screening process, and begin to coordinate with the consultant to conduct the cost-benefit analysis. Community engagement, including a survey which opened in September, Boards and Commissions briefings, and a virtual Open House, are planned through December 2020. A draft plan for stakeholder feedback is anticipated in Spring 2021 with the goal of presenting the draft plan to the Mayor and Council in summer 2021. Project information and updates will be posted on a project page on the city website and announced through various communication channels including the Environment & Sustainability newsletter list.

Addendum: Climate Action Plan Roadmap Stakeholder Feedback Tracker

Updated 6/2/2021*

Date	Reviewed by	Comments Summary
6/4/2020	Environment Commission	<p>Positive feedback on information presented and encouraged by the progress on the plan, which has roots in the 2040 Master Plan that many contributed to including the Environment Commission.</p> <p>Recommends the city consider the societal benefits of reducing carbon pollution as it prioritizes actions.</p>
9/21/2020	Mayor and Council	<p>Added forest protection to Figure 14, #7.</p> <p>Added Bicycle and Pedestrian Advisory Committees to Boards and Commissions list.</p> <p>Added “grants” to Criteria in Figure 13 Costs criteria description.</p> <p>Expanded cooling and absorption techniques under Figure 10: Climate Resiliency, to include green roofs, white roofs, and permeability.</p>
6/2/2021	Staff	<p>Minor formatting changes.</p> <p>Update of the total 2018 community greenhouse gas emissions received from MWCOG.</p> <p>Added Chamber of Commerce and Lincoln Park Civic Association to Boards and Commissions list.</p> <p>Updated dates in Figure 12.</p> <p>Added Chinese and Spanish translations of the survey.</p> <p>Added Office Hours and second Open House.</p>

*The changes above reflect feedback on this Roadmap document. Climate Action Plan contents feedback will be summarized separately.